

REMARKS

By the present amendment, the title has been amended, claims 1, 3, 5, 13 and 14 have been amended to correct minor errors, and claim 1 has been further amended to replace “an incident light” by “the incident natural light that comes from the light source via the light emitting means and emitted from the lower surface of the light pipe.”

Claims 1-14 are pending in the Office Action. Claim 1 is the only independent claim. The claims are directed to a liquid crystal display apparatus.

In the Office Action, the title is objected to as not descriptive.

The title has been amended to recite a light pipe with reflective polarizer. Accordingly, it is submitted that the objection should be withdrawn.

Next, in the Office Action, claim 3 is objected to for an informality.

The phrase “the light source can turn on and off light” has been corrected to “the light source can turn light on and off” in claim 3 as suggested in the Office Action. Accordingly, it is submitted that the objection should be withdrawn.

Next, in the Office Action, claims 1 and 5 are rejected under 35 U.S.C. 112, second paragraph, as indefinite. It is alleged in the Office Action that “said light source” in claim 1, line 3 and “the reference flat plane” and “the projected area” in claim 5, lines 8 and 14-15, lack antecedent bases.

Claims 1 and 5 have been amended to recite “a light source” in claim 1 and “a reference flat plane” and “a projected area” in claim 5. Accordingly, it is submitted that the rejection should be withdrawn.

Next, in the Office Action, claims 1, 2 and 10 are rejected under 35 U.S.C. 102(b) as

anticipated by US 5,856,855 to Mol et al. (Mol), and claim 11 is rejected under 35 U.S.C. 103(a) as obvious over Mol, and claims 3-9 and 12-14 are rejected under 35 U.S.C. 103(a) as obvious over Mol in view of US 6,590,625 to Umemoto et al. (Umemoto'625).

It is alleged in the Office Action that Mol discloses a display with a light pipe, reflection type polarizer and liquid crystal shutter as recited in claims 1, 2 and 10, that the quarterwave plate of claim 11 would have been an obvious optimization, and that Umemoto'625 discloses the light being turned on and off as recited in claim 3 as well as the structure with repeated pitches as recited in the other claims.

As a preliminary, Umemoto'625 is not available as a reference in an obviousness rejection because of common ownership as indicated in the Statement of Common Ownership included in this paper. Therefore, for this reason alone, the obviousness rejection of claims 3-9 and 12-14 is moot.

Further, reconsideration and withdrawal of the rejections of claims 1-2 and 10-11 over Mol alone is respectfully traversed.

In the display of Mol, a reflective polarizer 21 and a diffuser 23 or possibly also a reflector 27 are disposed in this order from the lower surface of the light guide, while a collimating structured surface may be provided on an upper surface of the light guide. The light emitted from the light source is separated by the reflective polarizer 21 into a reflected light ("unwanted" beam b2 on Fig. 2) which is reflected within the light pipe, and a transmitted beam which is then forward-diffused back through the reflective polarizer 21 by the diffuser 23, or reflected by the reflector 27 and transmitted by the reflective polarizer 21 (beam b1 on Fig. 2) (see Mol at col. 6, lines 6-35). Thus, in Mol, the light reflected by the reflective polarizer 21 is not emitted by the

light pipe until it has been depolarized, transmitted by the reflective polarizer and forward-diffused or reflected to be re-transmitted by the reflective polarizer. The construction of Mol is intended to provide a “purer direction of polarization” (Mol at col. 2, lines 33-34).

In contrast, in the presently claimed invention, the light reflected by the reflective polarizer is emitted through the upper surface of the light beam, as recited in present claim 1. An advantage of this feature is that the display provides enhanced contrast both in emission mode (light source on) and in reflection mode (light source off). In particular, in the reflection mode, it is possible to obtain an improved contrast between the reflected light (white display) and the transmitted light (black display), as discussed in particular in paragraph [0076] on page 37 of the present specification. Such advantage is not available with the display of Mol.

In summary, the features of present claims 1-2 and 10-11 and their advantages are not taught or suggested in Mol. Therefore, present claims 1-2 and 10-11 are not anticipated by, and not obvious over, Mol.

In view of the above, it is submitted that the rejections should be withdrawn.

Next, in the Office Action, claims 1-14 are rejected under the judicially created doctrine of double patenting for obviousness-type double patenting over the claims of US 6,459,461 to Umemoto et al. (Umemoto'461) in view of US 2003/0147042 to Kawamoto et al. (Kawamoto) or Mol.

Reconsideration and withdrawal of the rejection is respectfully requested. Umemoto'461 is directed to a linear reflective polarizer exclusively and does not teach or suggest a display using circularly polarized light.

Further, as discussed above, the device of Mol is very different from the presently claimed

invention in that the light emitted through the upper surface of the light guide is the light transmitted by the reflective polarizer, then redirected and re-transmitted. Therefore, a person of ordinary skill in the art would not seek to combine Umemoto'461 and Mol. In addition, like in Umemoto'461, and contrary to the presently claimed invention, the light emitted through the upper surface of the light guide in Mol is always linearly polarized.

Still further, Kawamoto discloses a circular reflective polarizer but the reflective polarizer is disposed between the light guide and the liquid crystal cell. In Kawamoto, only a simple reflector is disposed on the lower surface of the light pipe. Therefore, a person of ordinary skill in the art would not have been motivated to combine Umemoto'461 and Kawamoto as alleged in the Office Action.

In summary, Mol and Kawamoto fail to remedy the deficiencies of Umemoto'461, because even if, arguendo, a person of ordinary skill in the art had tried to modify Kawamoto'461 to use a circular reflective polarizer, that person would not have found any teaching or suggestion in Mol or Kawamoto that would have suggested the construction as presently claimed, in which circularly polarized reflected light is emitted through the upper surface of the light pipe, as recited in present claim 1. Therefore, the present claims are not obvious over Umemoto'461 taken alone or in any combination with Mol and/or Kawamoto.

In view of the above, it is submitted that the rejection should be withdrawn.

In conclusion, the invention as presently claimed is patentable. It is believed that the claims are in allowable condition and a notice to that effect is earnestly requested.

In the event there is, in the Examiner's opinion, any outstanding issue and such issue may be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants hereby petition for an appropriate extension of the response period. Please charge the fee for such extension and any other fees which may be required to our Deposit Account No. 50-2866.

Respectfully submitted,

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